CLAIMS

1. A method of generating a modulated navigation signal (7) which is intended to be used to position a downlink receiver (6), comprising multiple pseudorandom navigation codes of chip rhythms greater than 0.5 MHz, modulated onto a carrier of frequency fp greater than 500 MHz, wherein four pseudorandom navigation codes C1, C2, C1', C2' are modulated onto the carrier according to an 8-PSK modulation of constant amplitude with a modulation frequency fM such that:

$$8fc \leq fM$$

where fc = Max(fci), and fci designates the chip rhythms fc1, fc1', fc2, fc2' of the navigation codes C1, C2, C1', C2', each fci value being such that fM = Ni.fci, Ni being an integer greater than or equal to 8, two navigation codes C1, C1' being quadrature modulated at frequency f1 = fp-fM/8, and two other navigation codes C2, C2' being quadrature modulated at frequency f2 = fp+fM/8, and the modulated navigation signal presenting a constant envelope.

2. A method as claimed in claim 1, wherein fM is chosen to be ≤ 400 MHz.

3. A method as claimed in claim 1, for generating a modulated navigation signal (7) on board a space satellite, wherein fM is chosen to be ≤ 200 MHz.

4. A method as claimed in one of claims 1 to 3, wherein 8-PSK modulation of symmetrical constant amplitude in the Fresnel plan is used.

5. A method as claimed in one of claims 1 to 3, wherein 8-PSK modulation of asymmetrical constant amplitude in the Fresnel plan is used.

6. A method as claimed in one of claims 1 to 5, wherein 8-PSK modulation of phase states equal to $k.\pi/4$, where k is an integer between 1 and 8, is used.

7. A method as claimed in one of claims 1 to 6, wherein the four codes are modulated according to a truth table which is chosen from the group of truth tables formed from:

TABLE 1

C1(t)	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1
C2(t)	-1	-1	-1	-1	1	1	1	1	-1	-1	-1	-1	1	1	1	1
C1'(t)	-1	-1	1	1	-1	-1	1	1	-1	-1	1	1	-1	-1	1	1
C2'(t)	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1
t modulo 8TM																
[0,TM[	P5	P4	P4	P3	P6	P7	P5	P2	P6	P1	P3	P2	P7	P8	P8	P1
[TM,2TM[	P5	P8	P4	P3	P6	P7	P5	P6	P2	P1	P3	P2	P7	P8	P4	P1
[2TM,3TM[	P1	P8	P4	P7	P6	P7	P5	P6	P2	P1	P3	P2	P3	P8	P4	P5
[3TM,4TM[	P1	P8	P8	P7	P2	P7	P5	P6	P2	P1	P3	P6	P3	P4	P4	P5
[4TM,5TM[	P1	P8	P8	P7	P2	P3	P1	P6	P2	P5	P7	P6	P3	P4	P4	P5
[5TM,6TM[	P1	P4	P8	P7	P2	P3	P1	P2	P6	P5	P7	P6	P3	P4	P8	P5
[6TM,7TM[	P5	P4	P8	P3	P2	P3	P1	P2	P6	P5	P7	P6	P7	P4	P8	P1
[7TM,8TM[	P5	P4	P4	P3	P6	P3	P1	P2	P6	P5	P7	P2	P7	P8	P8	P1

TABLE 2

C1(t)	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1
C2(t)	-1	-1	-1	-1	1	1	1	1	-1	-1	-1	-1	1	1	1	1

C1'(t)	-1	-1	1	1	-1	-1	1	1	-1	-1	1	1	-1	-1	1	1
C2'(t)	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1
t modulo 8TM																
[0,TM[	P1	P8	P4	P7	P6	P7	P5	P6	P2	P1	P3	P2	P3	P8	P4	P5
[TM,2TM[	P1	P8	P8	P7	P2	P7	P5	P6	P2	P1	P3	P6	P3	P4	P4	P5
[2TM,3TM[	P1	P8	P8	P7	P2	P3	P1	P6	P2	P5	P7	P6	P3	P4	P4	P5
[3TM,4TM[	P1	P4	P8	P7	P2	P3	P1	P2	P6	P5	P7	P6	P3	P4	P8	P5
[4TM,5TM[	P5	P4	P8	P3	P2	P3	P1	P2	P6	P5	P7	P6	P7	P4	P8	P1
[5TM,6TM[	P5	P4	P4	P3	P6	P3	P1	P2	P6	P5	P7	P2	P7	P8	P8	P1
[6TM,7TM[	P5	P4	P4	P3	P6	P7	P5	P2	P6	P1	P3	P2	P7	P8	P8	P1
[7TM,8TM[	P5	P8	P4	P3	P6	P7	P5	P6	P2	P1	P3	P2	P7	P8	P4	P1

where P1, P2, P3, P4, P5, P6, P7, P8 are the various contacts and the 8-PSK constellation, and TM = 1/fM, and other truth tables derived from these truth tables TABLE 1 and TABLE 2 by phase rotation by $n.\pi/4$, $n \varepsilon \{1,2,3,4,5,6,7\}$ and/or reversal of the direction of the path of the constellation.

8. A method as claimed in one of claims 1 to 7, wherein fp is between 1000 MHz and 1700 MHz.

9. A method as claimed in one of claims 1 to 8, wherein fc is of the order of 10 MHz.

10. A method as claimed in one of claims 1 to 9, wherein fM is of the order of 120 MHz.

11. A method as claimed in one of claims 1 to 10, wherein in at least one pair of codes C1, C1'; C2, C2' which are quadrature modulated onto the same frequency, one C1'; C2' incorporates digital data which is modulated according to a frequency less than fc/1000.

12. A device for generating a modulated navigation signal (7) which is intended to be used to position a downlink receiver (6), comprising multiple pseudorandom navigation codes of chip rhythms greater than 1 MHz, modulated onto a carrier of frequency fp greater than 500 MHz, this device comprising:

- a circuit (11) to generate pseudorandom navigation codes,

- a phase-shifting modulator circuit (13) which supplies the modulated navigation signal (7) on the carrier,

- an emitter circuit (15), comprising at least one power amplification stage, and suitable for emitting a radio frequency signal corresponding to the modulated navigation signal,

wherein the modulator circuit (13) is suitable for modulating, on the carrier, four pseudorandom navigation codes C1, C2, C1', C2' of which the frequencies are an integer multiple of one of them fc, according to an 8-PSK modulation of constant amplitude with a modulation frequency fM such that:

$$8fc \leq fM$$

where fc = Max(fci), and fci designates the chip rhythms fc1, fc1', fc2, fc2' of the navigation codes C1, C2, C1', C2', each fci value being such that fM = Ni.fci, Ni being an integer greater than or equal to 8, two navigation codes C1, C1' being quadrature modulated at frequency f1 = fp-fM/8, and

two other navigation codes C2, C2' being quadrature modulated at frequency f2 = fp+fM/8, and the modulated navigation signal presenting a constant envelope.

13. A device as claimed in claim 12, wherein the modulator circuit (13) is suitable for implementing an 8-PSK modulation with a modulation frequency fM ≤ 400 MHz.

14. A device as claimed in claim 12, wherein the modulator circuit (13) is suitable for implementing an 8-PSK modulation with a modulation frequency fM ≤ 200 MHz.

15. A device as claimed in one of claims 12 to 14, wherein the modulator circuit (13) is suitable for implementing 8-PSK modulation of symmetrical constant amplitude in the Fresnel plan.

16. A device as claimed in one of claims 12 to 14, wherein the modulator circuit (13) is suitable for implementing 8-PSK modulation of asymmetrical constant amplitude in the Fresnel plan.

17. A device as claimed in one of claims 12 to 16, wherein the modulator circuit (13) is suitable for implementing 8-PSK modulation of phase states equal to k.π/4, where k is an integer between 1 and 8.

18. A device as claimed in one of claims 12 to 17, wherein the modulator circuit (13) is suitable for modulating the four codes according to a truth table which is chosen from the group of truth tables formed from:

TABLE 1

C1(t)	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1
C2(t)	-1	-1	-1	-1	1	1	1	1	-1	-1	-1	-1	1	1	1	1
C1'(t)	-1	-1	1	1	-1	-1	1	1	-1	-1	1	1	-1	-1	1	1
C2'(t)	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1
t modulo 8TM																
[0,TM[	P5	P4	P4	P3	P6	P7	P5	P2	P6	P1	P3	P2	P7	P8	P8	P1
[TM,2TM[	P5	P8	P4	P3	P6	P7	P5	P6	P2	P1	P3	P2	P7	P8	P4	P1
[2TM,3TM[	P1	P8	P4	P7	P6	P7	P5	P6	P2	P1	P3	P2	P3	P8	P4	P5
[3TM,4TM[	P1	P8	P8	P7	P2	P7	P5	P6	P2	P1	P3	P6	P3	P4	P4	P5
[4TM,5TM[	P1	P8	P8	P7	P2	P3	P1	P6	P2	P5	P7	P6	P3	P4	P4	P5
[5TM,6TM[	P1	P4	P8	P7	P2	P3	P1	P2	P6	P5	P7	P6	P3	P4	P8	P5
[6TM,7TM[	P5	P4	P8	P3	P2	P3	P1	P2	P6	P5	P7	P6	P7	P4	P8	P1
[7TM,8TM[	P5	P4	P4	P3	P6	P3	P1	P2	P6	P5	P7	P2	P7	P8	P8	P1

TABLE 2

C1(t)	-1	-1	-1	-1	-1	-1	-1	-1	1	1	1	1	1	1	1	1
C2(t)	-1	-1	-1	-1	1	1	1	1	-1	-1	-1	-1	1	1	1	1
C1'(t)	-1	-1	1	1	-1	-1	1	1	-1	-1	1	1	-1	-1	1	1
C2'(t)	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1	-1	1
t modulo 8TM																
[0,TM[	P1	P8	P4	P7	P6	P7	P5	P6	P2	P1	P3	P2	P3	P8	P4	P5
[TM,2TM[	P1	P8	P8	P7	P2	P7	P5	P6	P2	P1	P3	P6	P3	P4	P4	P5
[2TM,3TM[	P1	P8	P8	P7	P2	P3	P1	P6	P2	P5	P7	P6	P3	P4	P4	P5
[3TM,4TM[	P1	P4	P8	P7	P2	P3	P1	P2	P6	P5	P7	P6	P3	P4	P8	P5
[4TM,5TM[	P5	P4	P8	P3	P2	P3	P1	P2	P6	P5	P7	P6	P7	P4	P8	P1
[5TM,6TM[	P5	P4	P4	P3	P6	P3	P1	P2	P6	P5	P7	P2	P7	P8	P8	P1
[6TM,7TM[	P5	P4	P4	P3	P6	P7	P5	P2	P6	P1	P3	P2	P7	P8	P8	P1
[7TM,8TM[	P5	P8	P4	P3	P6	P7	P5	P6	P2	P1	P3	P2	P7	P8	P4	P1

where P1, P2, P3, P4, P5, P6, P7, P8 are the various contacts and the 8-PSK constellation, and TM = 1/fM, and other truth tables derived from these truth tables TABLE 1 and TABLE 2 by phase rotation by $n.\pi/4$, $n \varepsilon \{1,2,3,4,5,6,7\}$ and/or reversal of the direction of the path of the constellation.

19. A device as claimed in one of claims 12 to 17, wherein fp is between 1000 MHz and 1700 MHz.

20. A device as claimed in one of claims 12 to 19, wherein fc is of the order of 10 MHz.

21. A device as claimed in one of claims 12 to 20, wherein fM is of the order of 120 MHz.

22. A device as claimed in one of claims 12 to 21, which is adapted so that in at least one pair of codes which are quadrature modulated onto the same frequency, one C1', C2' incorporates digital data which is modulated according to a frequency less than fc/1000.